2/4 B.Tech SECOND SEMESTER

EE4T6   **PULSE & DIGITAL CIRCUITS**   **Credits: 4**

Lecture: 4 periods/week   Internal assessment: 30 marks
Tutorial: 1 period /week   Semester end examination: 70 marks

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Course Objectives:
- To Introduce the students the wave shaping circuits, Switching Characteristics of diode and transistor
- To analyze different types of Multi vibrators and their design procedures.
- To Introduce Time-base Generators and Principles of Synchronization & Frequency division.
- To Understand Sampling Gates and to Design NAND and NOR gates using various logic families.

Learning Outcomes:
- To understand the basic working & design of wave shaping circuits
- To analyze and Design of Multi-vibrator circuits and their applications.
- To understand Time-base generators and sampling gates.

UNIT I Linear wave shaping:
High pass, low pass RC circuits, their response for sinusoidal, step, Pulse, square and ramp inputs. RC network as differentiator and integrator, double differentiation circuit.

UNIT II Non – Linear Wave Shaping:
Diode clippers: Series & Shunt, Emitter coupled clipper, Transfer characteristics of clippers, Comparators, clamping operation, Positive & Negative clampers, biased clampers, Clamping circuit theorem, Transfer characteristics of clampers.

Unit III Switching Characteristics of Devices:
Diode and Transistor as switches, transistor-switching times break down voltage consideration of transistor, Design of transistor switch.

Unit IV Analysis & Design of Bistable Multivibrator:
Analysis and Design of Fixed bias transistor binary, Commutating capacitors, Triggering circuits, Non saturating binary, Schmitt trigger circuit and its Applications

UNIT V Analysis & design of Monostable, Astable Multivibrator:
Analysis and design of Monostable multivibrators (Collector-coupled and Emitter-coupled) using transistors, Analysis and design of Astable multivibrator (Collector coupled and Emitter-coupled) using transistors.

UNIT VI Time Base Generators:
General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators, Current time base generators.

Unit VII Synchronization and Frequency Division:
Principles of Synchronization, Frequency division in sweep circuit, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit.

Unit VIII Sampling Gates and Realization of Logic Gates:
Sampling gates; Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates. Realization of NAND & NOR Logic Gates using DTL, TTL, CMOS Logic circuits, Comparison of logic families

Text Books:
1. Pulse, Digital and Switching Waveforms by J. Millman and H. Taub, "McGraw-Hill, 1991.
2. Pulse and Digital Circuits by A. Anand Kumar PHI, 2005.Second Edition

References:
1. David J.Comer,"Digital Logic State Machine Design', Oxford University Press,2008,Third Edition.
2. Introduction to system design using integrated circuits, BS Sonde, New age International, II edition, 1992.